

## CLAIMS

1. A plasma reactor system for very fast etching of silicon or epoxy resins, comprising:
  - 5 a chamber containing a wafer-holding pedestal;
  - a vacuum pump connected to the chamber for exhausting gas from the chamber through a pressure regulation valve;
  - 10 a showerhead electrode positioned substantially parallel to the pedestal and at a distance less than 6 mm from it for injecting gas into the volume between pedestal and showerhead;
  - means for providing gases containing fluorine and/or oxygen to the showerhead electrode;
  - 15 an RF power source connected to the pedestal and/or to the showerhead electrode; and
  - means for controlling the pressure inside the chamber to a level greater than 1.5 Torr.
2. The reactor of Claim 1 wherein the ratio of the RF power provided between the showerhead electrode and the pedestal to the gas pressure is greater than 1 Watt per cubic centimeter to each Torr of gas pressure.
3. A process for very fast etching of silicon or epoxy resins, comprising the steps of:
  - 5 placing a wafer on a pedestal in a chamber;
  - exhausting gas from the chamber through a pressure regulation valve;
  - 10 introducing a gas containing fluorine and/or oxygen into chamber through a showerhead electrode which is positioned substantially parallel to and less than 6 mm from the pedestal;
  - applying RF power to the pedestal and/or the showerhead electrode;
  - 15 and
  - 10 maintaining the pressure inside the chamber at a level greater than 1.5 Torr.

4. The process of Claim 3 wherein the ratio of the RF power provided between the showerhead electrode and the pedestal to the gas pressure is greater than 1 Watt per cubic centimeter to each Torr of gas pressure.